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Knowledge, attitude and perception associated with pertussis among future health care providers: A cross-sectional assessment in a private medical college in Lahore

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ABSTRACT

Pertussis is widely spreading in the world, including Pakistan. The current study aims to evaluate the Knowledge, Attitude, and Practice of future healthcare workers toward pertussis. A cross-sectional observational study including 223 students from several faculties, such as medicine, physiotherapy, and pharmacy, at a private medical university was conducted. By using a validated questionnaire, this study was conducted to assess the Knowledge, Attitude, and Practices of students about pertussis from various faculties. Only faculty have a direct relationship (p -value=0.006) with knowledge regarding pertussis among all study variables. There is a non-significant association between attitude and practice towards pertussis and all study variables. The current study shows better Knowledge, good Practice, and positive Attitude regarding pertussis among future health providers.

Keywords: Pertussis, infectious respiratory disease, health providers, respiratory failure

1. INTRODUCTION

Bordetella pertussis is a gram-negative bacterium that causes whooping cough, also known as pertussis, an infectious respiratory disease (Decker and Edwards, 2021). The typical whooping cough is the illness's defining feature; patients with

pertussis also produce a lot of mucus, which is expelled by coughing and can sometimes induce vomiting (Van-der-Zee et al., 2015). During the final phase, known as convalescence, the frequency, length, and intensity of coughing reduced (Kilgore et al., 2016). In severe cases, it can cause extreme lymphocytosis, which is directly correlated with respiratory failure, intractable pulmonary hypertension, and death (Melvin et al., 2014). Globally, the pertussis incidence rate has increased in past years; recently, this disease was prevented with the help of vaccination or immunization (Esposito et al., 2019). In Germany, the pertussis attack rate increased in 2016 to a 16.8% rate and in 2017 to a 20.5% rate (Hitz et al., 2020).

In the South Gondar zone, Northwest Ethiopia, the infection attack rate of pertussis is 7.1% per 1000 persons (Wagaye et al., 2023). In Europe, the death rate is higher in older people > 65 years (17.4% fatal rate) than in adults aged 18-64 years (11.5% fatal rate) cases reported in European hospitals (Macina and Evans, 2021a). The risk of pertussis increases in adults having any respiratory tract disease and obesity (Jenkins et al., 2020). Pertussis generally has an incubation period of 7 to 10 days (Calvert et al., 2023). It leads to seizures and neurological issues similar to encephalopathy in Babies, due to reduced oxygen supply in the brain (Anh-Tuan et al., 2021). Adults and teenagers may transmit the disease to those close to the newborn (Esposito and Principi, 2016). If proper early care is not provided during pertussis, especially in older persons, it is difficult to identify and may lead to catastrophic consequences (Alti et al., 2022).

A secondary bacterial infection may develop, which causes many pertussis-related deaths (Macina and Evans, 2021b). In adults with pertussis complications, like (up to 4% of cases) rib fractures from coughing and (up to 5% of cases) pneumonia (Wang et al., 2023). When a person is enclosed with viruses, they can easily enter through orifices especially from the eyes, lips, and nose (Stadnytskyi et al., 2021). Antibiotics are mainly used for the pharmacological treatment of pertussis, macrolides, the first line of therapy (Feng et al., 2021). In the past, macrolides were mainly used for the treatment of pertussis, as their resistance increases, the sensitivity of macrolides decreases today (Zhang et al., 2022). Antibiotic prophylaxis is recommended by the CDC and AAP to manage pertussis outbreaks (Liang et al., 2018). Pertussis immunity, whether obtained by vaccination or spontaneous infection (Kilgore et al., 2016).

Reducing exposure to respiratory droplets from coughing or sneezing can help lower the risk of pertussis transmission in healthcare settings (Koenig et al., 2019). The primary strategy for preventing pertussis is to include the vaccine in regular childhood immunization schedules (Riolo and Rohani, 2015). Pregnant women, ideally in the third or late second trimester, and anyone having close contact with infants should have one dose of the DTaP vaccine, according to the ACIP (Kilgore et al., 2016). In an attempt to protect infants and children, vaccinations against the fatal *Bordetella pertussis* infection have been available since 1940 (Locht, 2021). In the early months of life, the fetus is shielded from these infections by the mother when she receives vaccination against pertussis (Fernández-Cano et al., 2022). The primary objective of this study is to evaluate the Knowledge, Attitude and Practice of future health care workers on pertussis. Fourth-year and final-year students are future healthcare providers. They provide health care services directly to the infected patients.

2. MATERIALS AND METHOD

A cross-sectional observational study was conducted to evaluate Knowledge, Attitude, and Practice regarding pertussis. This research collected data using a validated questionnaire. The validated questionnaire was utilized to assess the knowledge, attitude, and perception towards pertussis in future healthcare students, both final-year and pre-final-year students. The data for this survey was collected from students (pharmacy, medicine, and physiotherapy faculty) of a private medical college\university. The purpose of the study is to evaluate the knowledge of healthcare students about pertussis. The medical colleges have different healthcare professionals belonging to various medical fields, i.e., Medicine, physiotherapy, pharmacy, dental, psychology, and other medical programs. The duration of the research is one year approximately, from October 2022 to October 2023.

The inclusion criteria for this research are the healthcare students studying in their 4th and final professional years of pharmacy, medicine, and physiotherapy faculty included and those participants who provided consent to participate in this study voluntarily. The exclusion criteria for this study: undergraduate students from different universities, dental faculty, students from 1st, 2nd, 3rd year of pharmacy, medicine, and physiotherapy, the students who did not provide consent to participate in this study voluntarily and had a chronic illness were excluded. The sample size for this study is 223 students (79 from pharmacy, 81 from medicine, 63 from physiotherapy).

The demographic factors of participants are divided into different variables such as age, gender, year of study, place of study, and faculty. The questionnaire has four main parts: The first part includes an informed consent form, the second part includes fifteen knowledge-based questions, the third part contains ten attitude-based questions, and the fourth and last part consists of ten practice-based questions. The ethical review committee of a private medical college granted the ethical approval for this research. The ethical approval number for this research is (ZI/07/22). Data collected from the study participants was kept confidential so that study subjects could not be identified. Written consent was obtained from students before data collection. However, the demographic data of the students was kept confidential.

Statistical Analysis

The collected data was analyzed using SPSS version 24.0. Descriptive and inferential statistics were applied to analyze variables. The p-values <0.05 were considered statistically significant values in this study. To check the novelty of data, by using different tests such as the Kolmogorov-Smirnov test, kurtosis, and skewness. To evaluate the categorical data, statistical tests are applied, such as Chi-square and Fisher exact test. To calculate the effect size, the Cramer V rule and Phi square test were used.

3. RESULTS

A total of 223 candidates are participating in this present study. About 52.9% of pre-final year students have participated in this research. Females have a higher participation rate (68.2) than Males (31.8). Table 1 provides more information about the demographics of participants.

Table 1 Represents the demographic information of the candidates. (N=223)

Variables	N%
FACULTY	
Pharmacy	79 (35.4)
Medicine	81 (36.3)
Physiotherapy	63 (28.3)
YEAR OF STUDY	
Pre-final	118 (52.9)
Final	105 (47.1)
PLACE OF STUDY	
Hosteller	153 (68.6)
Non- Hosteller	70 (31.4)
GENDER	
Male	71 (31.8)
Female	152 (68.2)
AGE	
18-20 years old	23 (10.3)
21-25 years old	192 (86.1)
>25 years old	8 (3.6)

Medicine faculty students have 63.0% adequate knowledge; about Pertussis. Females have 67.8% of adequate knowledge regarding Pertussis. For further information on the knowledge of participants about pertussis, refer to (Table 2).

Table 2 Knowledge Count for Different Variables

Variables	Non-adequate	Adequate	P value
FACULTY			
Pharmacy	16 (20.3)	63 (79.7)	0.006
Medicine	30 (37.0)	51 (63.0)	
Physiotherapy	28 (44.4)	35 (55.6)	
YEAR OF STUDY			
Pre-final	36 (30.5)	82 (69.5)	0.368
Final	38 (36.2)	67 (63.8)	
PLACE OF STUDY			
Hosteller	53 (34.6)	100 (65.4)	0.497
Non- Hosteller	21 (30.0)	49 (70.0)	
GENDER			
Male	25 (35.2)	46 (64.8)	0.660
Female	49 (32.2)	103 (67.8)	
AGE			
18-20 years old	8 (34.8)	15 (65.2)	0.949
21-25 years old	63 (32.8)	129 (67.2)	
>25 years old	3 (37.5)	5 (62.5)	

Pharmacy Faculty have a 100.0% Positive attitude towards Pertussis. Hosteller students show 98.7% positive attitude on Pertussis. More details of participants attitude about pertussis are given in (Table 3). Participants ranging in age from 21 to 25 show 78.1% fair practice regarding Pertussis. Final-year students show 80.0% fair practice regarding pertussis. More information related to practice regarding Pertussis is given in (Table 4).

Table 3 Attitude Count for Different Variables

Variables	Neutral	Positive	P value
FACULTY			
Pharmacy	0 (0.0)	79 (100.0)	0.209
Medicine	3 (3.7)	78 (96.3)	
Physiotherapy	1 (1.6)	62 (98.4)	
YEAR OF STUDY			
Pre-final	3 (2.5)	115 (97.5)	0.372
Final	1 (1.0)	104 (99.0)	
PLACE OF STUDY			
Hosteller	2 (1.3)	151(98.7)	0.418
Non- Hosteller	2 (2.9)	68 (97.1)	
GENDER			
Male	1 (1.4)	70 (98.6)	0.767
Female	3 (2.0)	149 (98.0)	
AGE			
18-20 years old	0 (0.0)	23 (100.0)	0.720
21-25 years old	4 (2.1)	188 (97.9)	
>25 years old	0 (0.0)	8 (100.0)	

Table 4 Practice Count for Different Variables

Variables	Poor Practice	Fair Practice	Good Practice	P value
FACULTY				
Pharmacy	8 (10.1)	63 (79.8)	8 (10.1)	0.857
Medicine	9 (11.1)	60 (74.1)	12 (14.8)	
Physiotherapy	6 (9.5)	47 (74.6)	10 (15.9)	
YEAR OF STUDY				
Pre-Final Year	14 (11.9)	86 (72.8)	18 (15.3)	0.459
Final Year	9 (8.6)	84 (80.0)	12 (11.4)	
PLACE OF STUDY				
Hosteller	16 (10.5)	122 (79.7)	15 (9.8)	0.060
Non-Hosteller	7 (10.0)	48 (68.6)	15 (21.4)	
GENDER				
Male	8 (11.3)	53 (74.6)	10 (14.1)	0.924
Female	15 (9.9)	117 (77.0)	20 (13.1)	
AGE				
18-20 years old	4 (17.4)	16 (69.6)	3 (13.0)	0.212
21-25 years old	18 (9.4)	150 (78.1)	24 (12.5)	
>25 years old	1 (12.5)	4 (50.0)	3 (37.5)	

4. DISCUSSION

The adequate knowledge of pharmacy faculty (79.7%) on pertussis is more as compared to the other faculties. The result of the current study shows that knowledge of pertussis has a direct relation with faculty (p -value=0.006) of private medical colleges. The probable reason behind this is that pertussis is included in the pharmacy curriculum. The study conducted in Malaysia in 2020 is in contrast with current study findings (White, 2020). The pharmacy faculty has a more positive attitude (100.0%) towards pertussis than other faculties. The p -value of 0.209, indicates that there is no significant association between the attitude about pertussis and the faculty. The main reason is that the pharmacy faculty deeply studied pertussis in different aspects as included in their curriculum. A study conducted among the students of the Public University of Malaysia in 2019 is in contrast with our current study findings (White, 2020).

Fair practice is more in pharmacy faculty (79.8%), while good practice is more in physiotherapy faculty (15.9%) toward pertussis. The p -value is 0.857, which shows that a non-significant association is present between faculty and practice on pertussis. The reason is physiotherapist improves the life style by educating patients about exercise. The study conducted in 2022 in Turkey shows that physicians have poor practice towards pertussis, which is in line with current study findings (Karatekin et al., 2022). Adequate knowledge of pre-final-year (69.5%) is more in comparison with final-year students, towards pertussis. There is no significant relationship (p -value=0.368) between the year of study and knowledge about pertussis. The reason behind this is that pre-final-year students recently studied pertussis. The study conducted in Finland, Germany, Poland, and Spain, in 2011, is in contrast with the present study's findings (Hoffait et al., 2011).

The final-year students show a more positive attitude (99.0%) towards pertussis with a p -value of 0.372, showing an insignificance of the relation between the place of study and attitude toward pertussis. One of the reasons is that the students of the final year thoroughly study pertussis and have a better disease understanding. The study conducted in Germany and Hungary, in 2019, is in contrast with this study's findings (Böhme et al., 2019). The final-year students have better fair practice (80.0%), whereas the pre-final-year students have good practice with a rate of 15.3, about pertussis. Non-significant relationship (p -value=0.459) presents between the year of study and practice towards pertussis infection. The main reason is that pre-final and final-year students are future healthcare providers. In 2011, the study conducted in Spain, Finland, Germany, and Poland is in contrast with our current study findings (Hoffait et al., 2011).

Non-hosteller participants have adequate knowledge (70.0%) of pertussis as compared to the hosteller participants. The p-value, 0.497, shows that a non-significant association was observed between the place of study and pertussis knowledge. The main reason is hosteller life is difficult and stressful. The study conducted in 2014 in Australia is in contrast with this study's findings (Ridda et al., 2014). The hosteller students, compared to those who are not hostel residents, have a more positive attitude (98.7%) regarding pertussis. The p-value of 0.418 identifies no correlation between the place of study and the attitude towards pertussis. The probable reason is that the hostellers have the capability to deal with different kinds of persons. The study conducted in New York in 2014 is not similar to the current study findings (Suryadevara et al., 2014).

The non-hosteller has good practice (21.4%) on pertussis in comparison with the hosteller students. There is a non-significant association between place of study and practice towards pertussis infection, with a p-value of 0.060. The probable reason is the hosteller has a very busy life. The study conducted in Singapore in 2007 is in contrast with the present study findings (Wilder-Smith et al., 2007). Female respondents have adequate knowledge (67.8%) of pertussis as compared to the male respondents of this study. There is no significant association (p-value=0.660) observed between gender and knowledge about pertussis. The probable reason is that females have a high participation rate. The study conducted in Korea, in 2015, is opposite with present study's findings (Ko et al., 2015). The male respondents show a more positive attitude of 98.6% towards pertussis whereas females show an attitude of 98.0%. The p-value of 0.767 indicates the gender variable is not significantly correlated with the attitude regarding pertussis. The most likely reason is that males are more socially active as compared to females.

A study conducted in Italy in the year 2020 is not aligned with our current study findings (Mazzilli et al., 2021). Male participants have good practice (14.1%) on pertussis as compared to the female participants. The p-value, 0.924, shows that no direct relation is present between practice on pertussis and gender. The reason is that males are more responsible. A study conducted in KSA in 2017 indicates that females as parents have good practice towards pertussis is in contrast with our current study findings (Alenazi et al., 2017). The students aged 21-25 years have adequate knowledge (67.2%) of pertussis in comparison with other aged group participants. The p-value is 0.949, which shows that no direct relation is present between age and knowledge about pertussis. The reason behind this is that 21-25-year-old group students are more dedicated to their studies. The study conducted in Poland in 2022 is in contrast with this study's findings (Borowski et al., 2022).

The attitude regarding pertussis is positive in those who are between the ages of 18 to 20 years old (100.0%) and those who are above 25 years (100.0%) of their age. The p-value of 0.720 shows a non-significant association between the age of respondents and their attitude regarding pertussis. The respondents between the ages of 18 to 20 years were very serious about their future as their first step towards professionalism and willing to learn more things whereas the respondents above 25 had already learned about pertussis and are professionals. A study conducted in Italy in 2022 is in line with this study's findings (Mercogliano et al., 2023). The respondents aged >25 years show good practice (37.5%) towards pertussis in comparison with other age groups. The p-value is 0.212, showing an insignificant association between the practice of pertussis and the aged groups. The main reason is that more than 25-year age students are mature with a focused mindset. The study conducted in Saudi Arabia in 2018 indicates that this study is aligned with our current study findings (Alagsam and Alshehri, 2019).

5. CONCLUSION

This study concludes that future healthcare providers will have better practice, knowledge, and a positive attitude regarding pertussis infection. Only faculty have a direct association with knowledge about pertussis. The insignificant relationship observed between all study variables and practice, and attitude on pertussis.

Authors' Contributions

All the authors contribute equally. All Authors read the final Manuscript.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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